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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/595,583	06/15/2000	John D. Mize	30-5074(4015)	9989

7590 03/05/2003

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EXAMINER
GAKH, YELENA G

ART UNIT	PAPER NUMBER
1743	14

DATE MAILED: 03/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

mk-14

Office Action Summary	Application No.	Applicant(s)	
	09/595,583	MIZE ET AL.	
	Examiner	Art Unit	
	Yelena G. Gakh, Ph.D.	1743	

-- The MAILING DATE of this communication appears on the cover sheet with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 January 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45 and 47-58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-45 and 47-58* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 June 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

1. Response, filed on 01/02/03, is acknowledged. Claims 1-45 and 47-58 are pending in the Application.

2. Since no amendment was filed with the response and the Applicants' arguments are not convincing, the rejections stand as they were established in the previous Office action.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. **Claims 1-16, 21-36, 38-40, 42-45 and 47-58** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pavate in view of Woodard et al. (US 5,494,743) and Nakanouchi or Sawamura (US 4,232,970).

Pavate discloses a method of generating information about particulates present in a fluid: "inclusion content of the target may be measured using a wet chemical dissolution technique. In one such method polyethylene beakers are thoroughly cleaned before use. Acids and reagent water are filtered through 0.45-micron diameter, membrane filters before use. Sample aluminum targets are rough cut by saw to sample sizes such as 1 gram each, then finished to 240 grit on polishing wheels. The samples are then precleaned by dipping in a separate bath of 30% HCl for a short time (e.g., 5 seconds) just before full dissolution, in order to remove any traces from the grinding. The samples are thereafter dissolved to their full extent in a clean aqueous solution having 30% HCl at room temperature or higher. 100 mL is used in the case of 1 gram samples, and 500 mL is used for 10-30 gram samples. **Solids are collected out of the HCl solution on 0.45 micron gridded diameter filters for optical microscopy/SEM analysis, and on 0.22 micron ungridded 47 mm diameter filters for chemical analysis**. Copper is dissolved off using a 10% HNO.sub.3 wash on the filters. All these operations should be carried out in a HEPA filtered laminar flow hood. The washed filters are then allowed to dry in a class 100 clean room, before microscopic examination. The inclusion size distribution may be determined using manual light microscopy techniques such as, ASTM F24 and F25. Oblique lighting should be used to prevent contamination during the analysis" (col.13, lines 14-40). Solids not dissolved in the reagent include metal oxides (Al2O3), nitride precipitates, carbide precipitates (col.2, lines 45-50). The silicon content should be less than 1% by weight (col. 11, lines 38, 39).

Pavate fails to disclose determining a relative contrast of two or more of the particulates, specifically a relative content of at least one of carbon and oxygen.

Woodward discloses antireflection coatings for carbon-based polymer substrates, comprising inorganic metal compounds, including metal oxides, having index of refraction greater than that of the substrate, which results in a contrast image obtained by light microscope (Abstract and Fig. 8).

It would have been obvious for anyone of ordinary skill to apply conventional knowledge of a difference of refractive indices of carbon- and oxygen-containing compounds, which results

in relative contrasts of these compounds in light microscopy, as demonstrated by Woodward, to Pavate's method, because this gives information about nature of the particulates, rather than just their sizes, and thus expands Pavate's method.

Although Woodward does not specifically disclose relative contrast of the two types of components relative to a background, it would have been obvious for anyone of ordinary skill to modify Pavate-Woodward's method by installing a suitable filter in the microscope to get different contrast of both types of the components relative to the background, because it is more convenient, than comparing contrast of these components relative to each other.

Pavate in view of Woodward does not specifically disclose automated scanning of a substrate with a microscope along the grid with following digital image processing.

Sawamura discloses an apparatus for automatic diagnosis of cells, comprising a microscope, a scanning stage on the microscope, and a detector assembly for detecting the light absorbance of the sample.

Nakanouchi teaches a method of producing fine particles, comprising dissolving a composition in methanol, filtering the solution with depositing undissolved particles on the substrate, drying them and analyzing them with an electron microscope, generating data on their size and shape.

It would have been obvious for anyone of ordinary skill to use automated scanning of the substrate with the light microscope, as disclosed by Sawamura, or electron microscope with following digital image processing, as taught by Nakanouchi, in Pavate-Woodward's method, because the automated scanning is a more advanced technique, comparing to manual scanning. Also, see *In re Venner*, 120 USPQ 192 (CCPA 1958) (to provide a mechanical or automatic means to replace manual activity which accomplishes the same result is within the skill of a routineer in the art). It would have been obvious to scan along the grid of the substrate, because Pavate discloses gridded filters, which provide this opportunity for both optical and electronic microscopy, and scanning along the grid is a conventional technique for automatically scanning microscopes.

Although Pavate in view of Nakanouchi does not disclose specifically solution containing exclusively aluminum, or copper, or both, or comprising lead or silver, or does not indicate that the predominant impurity is carbon, it would have been obvious to everyone of ordinary skill that the content of the solution depends on the content of the composition, treated by the "wet

chemical dissolution technique", disclosed by Pavate, and can be varied on the bases of routine experimentation.

It would have been obvious that the composition can be obtained from any one of a cast material, a sputtering target, or a solder.

It would have been a routine experimentation for anyone of ordinary skill in the art to spread the impurities of the composition on the substrate in the most convenient way, including subdividing flow pattern into a grid pattern, to optimize the conditions of scanning.

7. **Claims 17-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pavate in view of Woodard and Nakanouchi or Sawamura (PWNS), as applied to claims 1-16, 21-36, 38-40, 42-45 and 47-58 above, and further in view of King.

PWNS does not particularly teach calculating a concentration of undissolved material, e.g. metal oxides or carbon.

King teaches analysis with electron microscope of multielement samples, comprising calculation of the concentrations of different elements in the composition.

It would have been obvious for anyone of ordinary skill to use King's technique of calculating concentrations of undissolved material, including those of different oxides or carbon, in PWNS method of determining the content of the undissolved material by optical microscopy/SEM analysis, because the type and quantity of the undissolved material determines the quality of the composition.

8. **Claims 37 and 41** are rejected under 35 U.S.C. 103(a) as being unpatentable over PWNS, as applied to claims 1-16, 20-36, 38-40, 42-45 and 47-58 above, and further in view Kitamura.

PWNS does not particularly disclose displaying results as a histogram.

Kitamura teaches a particle analysis method "performed with a **scanning type electron microscope** which directs a narrow, focused electron beam through an electromagnetic lens onto a surface of a sample mounted on a high precision stage in scanning, produces a detection signal representing intensity of secondary electrons or reflected electrons from the sample surface, and displays a representation of the sample surface based on the detection signal, the method comprising the steps of: reading the image by controlling the **electron microscope** by automatically shifting views produced by scanning the electron beam from a most probable spot

where particles may exist to less probable spots in sequence based on information contained in the signal of coordinates of a particle location; determining the particle detection location and acquiring a detection evaluation value in the image, under the assumption that the normal distribution portion of a **histogram** of detection intensity is due to a simple pattern and that the rest of the distribution of the histogram is due to a particle; and scanning a location where particles are determined to exist based on the result of the determining step" (col.1, lines 35-58).

It would have been obvious for anyone of ordinary skill to represent the results of PWNS method as a histogram, as taught by Kitamura, because it is a convenient way to represent the content of the composition, obtained by optical microscopy/SEM analysis.

Response to Arguments

9. Applicant's arguments filed 06/06/02 have been fully considered, but they are not persuasive. Pavate discloses obtaining particulates on gridded filters exactly the same way and with particulates of the same origin, i.e. metal oxides and carbide precipitates, as disclosed in the instant invention. While Pavate does not specifically disclose using microscope for determining relative contrast of these particulates, obtaining contrast images for materials having different refractive indices is a well-known method of analysis by light and electron microscopy. As an example, Woodward employs this method in his analysis of contrast images of antireflective metal oxide coating *vs.* carbon based polymer substrate. Woodward specifically discusses contrast images of carbon-containing material and metal oxides, and it is absolutely not clear, what the shape of these materials has to do with their refractive properties, which are the basis for applying optical and electron microscopy in determining the type of the material.

It would have been obviously for anyone of ordinary skills in the art to choose a filter, which would give a background contrasting both dark and light components, i.e. being darker than the lighter component and lighter than the darker component. The Applicants' arguments that choosing such filter is novel and non-obvious over the prior art are not persuasive.

The Applicants' did not provide any evidence that dissolving solids in a mixture of HCl and HNO_3 *vs.* dissolving them first in HCl and then in HNO_3, as disclosed by Pravate, would

lead to non-obvious and unexpected results, and that such variation in treating solids with acids somehow changes the output.

The Applicants' arguments, that providing at least 5% of surface for scanning with a light microscope with sufficient number of points for obtaining reliable results is not obvious for anyone of ordinary skills in the art, are not convincing. The examiner thinks that it would have been non-obvious to provide less than 5% of surface with particles grouped together and insufficient number of points for conducting a light microscopic analysis.

Regarding the arguments related to King and Kitamura, the Applicants seem to attack references individually, while rejections are based on combinations of references. King calculates concentrations of different elements in a composition, and these elements can be carbides and metal oxides giving contrast images, as disclosed by Pavate-Woodward-Nakanouchi/Samara.

The same is true for Kitamura prior art, which discloses displaying results as a histogram. It is not clear, why Kitamura should teach all limitations disclosed in Pavate-Woodward-Nakanouchi/Samara, when it is used as a secondary reference.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (703) 306-5906. The examiner can normally be reached on 10:00am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (703) 308-4037. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7165 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

YG
February 26, 2003

Jill Warden
Supervisory Patent Examiner
Technology Center 1700